Fishery Management Report No. 05-43

Chignik Management Area Commercial Salmon Fishery Harvest Strategy, 2005

by

Kenneth A. Bouwens

July 2005

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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ABSTRACT

This paper provides stakeholders with general information about how the Alaska Department of Fish and Game will manage the 2005 Chignik salmon fishery The 2005 total sockeye salmon forecasted run for the Chignik River watershed is forecasted at 2,390,000 fish. The total projected commercial harvest for both runs is 1,790,000 sockeye salmon, of which approximately 1,430,000 sockeye salmon are expected to be harvested in the CMA; the remainder are expected to be harvested in the Southeastern District Mainland and Cape Igvak fisheries. The early run is expected to be strong in comparison to the late run. The first commercial fishing period in the Chignik Bay, Central, and Eastern districts will occur when approximately 20,000 sockeye salmon have passed the Chignik River weir. The first commercial fishing period in the Western and Perryville Districts can occur on July 6, as long as Chignik River sockeye salmon escapement objectives are expected to be met. Subsistence salmon fishing permits will be available at the Chignik weir and from several other local vendors. This permits lists provisions in which commercial salmon fishermen may harvest subsistence salmon during the commercial salmon fishing season.

Key words: Chignik, sockeye salmon, Chinook salmon, pink salmon, chum salmon, coho salmon, Chignik Management Area, 2005 management.

INTRODUCTION

This document was written to provide stakeholders with the basic framework that the Alaska Department of Fish and Game (ADF&G) will use to manage the 2005 Chignik Management Area (CMA; Area L) commercial salmon fishery. ADF&G manages the commercial salmon fisheries within the CMA to achieve escapement objectives for all salmon species while allowing for the harvest of fish surplus to the escapement objectives.

The CMA encompasses all coastal waters and inland drainages of the northwest Gulf of Alaska between Kilokak Rocks and Kupreanof Point (Figure 1). The CMA is divided into five fishing districts: Eastern, Central, Chignik Bay, Western, and Perryville, which are further divided into statistical reporting areas (Figure 2).

During March 2005 the Alaska Supreme Court released its opinion on Michael Grunert v. State of Alaska and Chignik Seiners Association Inc. In effect, the court determined that the Alaska Board of Fisheries (BOF) adopted cooperative fishery management plan (5 AAC 15.359) was not legal. In May of 2005 the BOF attempted to address the concerns of the court and adopted another Chignik cooperative management plan (5 AAC 15.358). This new plan was then challenged in the Alaska Superior court and it was also considered illegal. However, the Alaska Supreme Court issued a stay on the decision in early June, for the 2005 fishing season. Therefore, the Chignik cooperative will be in place in 2005.

A total of 76 Chignik Commercial Fisheries Entry Commission (CFEC) salmon seine permit holders chose to form a cooperative in 2005. Pursuant to 5 AAC 15.358, the cooperative fleet is allocated 68.4% and the competitive fleet is allocated 31.6% of the CMA sockeye salmon harvest. The department will manage the entire CMA commercial salmon fishery to achieve these allocations as closely as possible.

Several changes were made to the Chignik subsistence and commercial salmon regulations during the November 2004 BOF meeting. These changes are outlined in this document.

CLOSED WATERS

Closed water areas applicable to the 2005 commercial salmon fishing season are described in 5 AAC 15.350. All boundaries will be determined using the global positioning system (GPS; 5

AAC 15.206). In November of 2004 the BOF placed the Mallard Duck Bay, Schooner Bay, Mensis Point, and Pillar Rock markers into regulation. Therefore, beginning with the 2005 season, the latitude and longitude of these markers will not be described through emergency order and announced via news release. Instead, news releases will mention these markers by name only. The exact locations of these markers can be found in 5 AAC 15.350 (1), and will be marked with ADF&G regulatory markers.

GEAR DESCRIPTION

Purse seines and hand purse seines are the only legal commercial salmon fishing gear within the CMA. Legal seine gear may be between 100-125 fathoms in length in the Chignik Bay District and 100-225 fathoms in length in all other districts. More specific seine specifications are listed in 5 AAC 15.332.

The cooperative fleet is allowed to use longer seines within certain areas of the Chignik Bay District under the auspicies of a Commissioner's Permit. This permit is outlined in Appendix A1.

NET PENS

Net pens are allowed in the CMA to hold live salmon prior to processing in an attempt to increase the quality of the finished product. Net pens (floating structures that do not have a metal, fiberglass, or wood hull separating the fish from sea) will only be allowed under provisions of a Commissioner's permit issued by ADF&G (Appendix B1). Live fish held under provisions of this permit may not be tendered or transported outside of the Chignik Bay District of the CMA. Fishing and tendering vessels may contain live fish without the need of a Commissioner's permit.

FIXED LEADS

The BOF authorized the cooperative fleet to use fixed leads to increase the efficiency of their harvesting efforts in hopes of reducing overhead costs under provisions of a Commissioner's permit issued by ADF&G (Appendix C1). The Commissioner's permit allows for the use of two fixed leads in the Chignik River. The Commissioner's permit contains a legal description of the construction, operation, and location of the leads.

REPORTING REQUIREMENTS

The tender and processor requirements are detailed in the Chignik Area commercial fishing regulations (5 AAC 15.355). Processors are required to report the prior day's catch information, by fleet, to ADF&G by 10:00 AM daily by e-mail, telephone, or radio (SSB or VHF). The preferred method of catch reporting is e-mailing an Excel spreadsheet (a template will be provided) to Chignik weir staff (kenneth_bouwens@fishgame.state.ak.us). It is the responsibility of the processor to contact the department to determine catch reporting protocols. Failure to report daily catch information in a timely manner is a violation of commercial fishing regulations (5 AAC 15.355), which will be strictly enforced.

Fishermen are reminded that all salmon caught must be reported on an ADF&G fish ticket. Commercially caught salmon kept for personal consumption shall be recorded as such on the fish ticket. Fishermen are reminded that it is their responsibility to secure a market for all of their catch before harvesting fish. Discarding commercially caught salmon is prohibited by Alaska Statue (AS 16.05.831), which will be strictly enforced.

EMERGENCY ORDERS AND NEWS RELEASES

Fishing periods will be established by emergency order when salmon abundance is expected to be surplus to escapement requirements. News releases will be issued prior to fishery openings to notify the fishermen and processors of any impending commercial fishing period. News releases will be broadcast over VHF channel 6 and sent via e-mail to interested parties at the time of release. Please contact the Chignik weir to be placed on the e-mail list. In addition, information including catch, escapement, and fishery data will be broadcast VHF channel 6 at 9:00 AM and 6:15 PM daily.

2005 SALMON FORECASTS

SOCKEYE SALMON

Total Run

The 2005 total sockeye salmon *Oncorhynchus nerka* forecasted run for the Chignik River watershed is forecasted at 2,390,000 fish (Appendix D1). The early run peaks in late June and returns primarily to Black Lake. The late run peaks in late July and returns primarily to Chignik Lake. The total projected commercial harvest for both runs is 1,790,000 sockeye salmon, of which approximately 1,430,000 sockeye salmon are expected to be harvested in the CMA, the remainder are expected to be harvested in the Southeastern District Mainland (SEDM) and Cape Igvak fisheries (5 AAC 09.360 and 5 AAC 18.360).

Black Lake (Early Run)

The early run is projected to be 1,840,000 sockeye salmon (Appendix D1). The escapement goal range for the early run is from 350,000 to 400,000 sockeye salmon (Table 1). In 2005, the lower end of the escapement goal will be targeted and the total early-run commercial harvest is projected to be 1,490,000 sockeye salmon. Approximately 313,000 of these salmon are expected to be harvested in the SEDM and Cape Igvak salmon fisheries, and about 1,180,000 to be harvested in the CMA.

Chignik Lake (Late Run)

The late run is projected to be 552,000 sockeye salmon (Appendix D1). The management objective range for the late run is from 250,000 to 300,000 sockeye salmon through September 15 (Table 1). In 2005, the lower range of the escapement objectives will be targeted and the late-run commercial harvest is projected to be 302,000 sockeye salmon. Approximately 47,600 of these are expected to be harvested in the SEDM and Cape Igvak salmon fisheries, and about 254,000 are expected to be harvested in the CMA.

OTHER SALMON SPECIES

Forecasts are not prepared for the salmon species other than sockeye salmon. Historic harvest averages are not a reliable indicator of production trends because only sockeye salmon have been targeted in recent years. The CMA Chinook *O. tshawytscha* salmon harvest is mostly dependent upon the amount of commercial fishing time for sockeye salmon in July. Historically, the majority of pink *O. gorbuscha* and chum *O. keta* salmon are harvested within the Western and Perryville Districts; however, low prices and limited market interest in pink and chum salmon from the outside districts may greatly reduce commercial efforts, and therefore harvests, in 2005. The coho *O. kisutch* salmon commercial harvest may vary depending on the commercial fishing effort directed on the late sockeye salmon run or local pink and chum salmon runs in the outside

districts. Subsistence concerns in the Western and Perryville Districts and market conditions may also limit coho salmon commercial fishing effort.

2005 CHIGNIK SALMON MANAGEMENT

JUNE

In November of 2004 the BOF adopted new regulations concerning the opening of the first commercial salmon fishery of the season. The first period can open when 20,000 sockeye salmon have escape into the Chignik River; however, if the department determines that a strong buildup of sockeye salmon exists in Chignik Lagoon and that 20,000 sockeye salmon will escape into the Chignik River, the department may open commercial fishery before 20,000 sockeye salmon have passed the weir. The purpose of this regulation is to allow more subsistence fishing opportunity prior to the commercial fishing season while avoiding a large buildup of salmon in the lagoon. The department will likely begin test fishing on or about June 2 to assess any salmon buildup in the Chignik Lagoon. The department may test fish several times in early June depending on test fish vessel catch rates and escapement levels.

The first commercial fishing period is likely to begin using the Humes Point markers, and then possibly moving to the Mensis Point markers after 24 hours. Processors have indicated an overall increase in the quality of the commercial harvest as a result of this management strategy. Quality likely improved because salmon holding upstream of Humes Points were given an extra day to migrate upriver and escape the fishery while fish migrating into the lagoon were harvested. During the 2005 salmon season, opening and closing commercial fishing between the Humes and Mensis Points markers may be utilized as a management tool for providing quality salmon and for assessing the run strength.

Subsequent commercial fishing periods will be determined through the evaluation of several factors, including commercial and subsistence catches, test fishing results, and the achievement of interim escapement objectives (Table 1). During June, commercial salmon fishing may only be allowed in the Chignik Bay, Central, and Eastern Districts. Through approximately June 26, these districts are required to open and close concurrently (5 AAC 15.357 (c)(1)).

TRANSITION PERIOD

The transition between the early and late runs typically takes place in late June and early July. Prior to 2004, scale pattern analysis (SPA) was used to differentiate stock composition during this time, and the fishery was managed based on the results of this analysis. This program was discontinued prior to the 2004 season. An exhaustive analysis showed that, on average, the number of early-run sockeye salmon that passed the Chignik weir after July 4 was approximately equal to the number of late-run sockeye salmon that passed the weir prior to July 4. Therefore, like in 2004, the 2005 fishery during the transition period will be managed based on the achievement of interim escapement objectives with the early-run escapement goal of 350,000 to 400,000 ending at midnight July 4 (Table 1). It was determined that the department will target the lower end of this range in response to recent high escapement levels and low juvenile salmon forage availability in Chignik Lake (Appendix E1).

The Chignik Bay and Central Districts will open concurrently and be managed based on interim sockeye salmon escapement objectives. The Eastern District will likely be closed during the transition period to evaluate the strength of Chignik River late run sockeye salmon. The Western and Perryville Districts will also remain closed during the transition period.

JULY

The Chignik River sockeye salmon escapement objectives for July range from 150,000 to 200,000 sockeye salmon (Table 1). It was determined that the department will target the lower end of this range in response to historic high escapement levels and low juvenile salmon forage availability in Chignik Lake (Appendix E1).

The Chignik Bay and Central Districts will be primarily managed based on Chignik River sockeye salmon run strength in July. The Chignik River Chinook salmon minimum escapement goal is 1,450 fish. If Chinook salmon escapement in early July is weak and the escapement goal is unlikely to be met, the Humes Point markers may be used to improve Chinook salmon escapement by removing commercial fishing pressure from areas where they may mill in the Chignik Lagoon before entering the Chignik River. Historically, over 50% of the Chinook salmon escapement passed through the weir by July 11.

In July, the Eastern District will be managed for pink and chum salmon only if Chignik River sockeye salmon escapement objectives are expected to be met. The first commercial salmon fishing period in the Eastern District can occur as early as July 8, and is likely to be 48 hours in duration. Extensions to this time will depend on pink and chum salmon fishery performance (catch per unit effort; CPUE) as compared to historical catch records, and expected Chignik River sockeye salmon escapement levels. Closed waters may be expanded around select streams if individual pink and chum salmon escapements are not expected to meet escapement needs.

Pink and chum salmon commercial fishing periods in the Western and Perryville districts may be allowed beginning July 6. Similar to the Eastern District, these periods may only be allowed if Chignik River sockeye salmon escapement objectives are expected to be met. The first commercial salmon fishing period in these districts is likely to be 48 hours in duration; extensions to this time will depend on pink and chum salmon fishery performance (CPUE) as compared to historical catch records, and expected Chignik River sockeye salmon escapements.

The July the commercial salmon fisheries in the Western and Perryville districts will take place south of a line drawn from Cape Itki (56^{o} 00.32’ N lat., 158^{o} 32.02’W long.) to Coal Cape (55^{o} 53.42’ N lat., 159^{o} 24.57’ W long.) to Cape Alexander (55^{o} 47.22’ N lat., 159^{o} 24.57’ W long.), and outside of Ivanof Bay south of Alexander Point (55^{o} 47.37’ N lat., 159^{o} 24.37’ W long.; Figure 3) Those portions of the Central, Chignik Bay, and Western districts known as “Jacks Box”, as defined in regulation, will be opened concurrently with the Western and Perryville Districts (Figure 4). No more than 60,000 coho salmon may be taken from July 22 to 31 in the Western and Perryville Districts; if the coho salmon harvest approaches this number, these districts will be closed.

AUGUST AND SEPTEMBER

In November 2004 the BOF directed the department to escape an additional 25,000 sockeye salmon into the Chignik River above the amount needed to reach published escapement goals in response to concerns that subsistence users were unable to meet their late-season salmon harvest needs. Therefore, the August escapement objective has been changed to 75,000 sockeye salmon, and the September 1-15 escapement objective remains at 25,000 sockeye salmon.

The Chignik Bay and Central Districts will be managed based on Chignik River sockeye salmon run strength. Directed fisheries cannot occur on pink, chum, or coho salmon within the Chignik Bay or Central Districts if Chignik River sockeye salmon escapement objectives are not expected

to be met. However, management actions (such as increasing closed waters) may be taken in these districts to increase the salmon escapement if local pink, chum, or coho salmon escapements are weak.

The Chignik weir will be removed on about September 4. After this point, the following methods may be used to assess Chignik River sockeye salmon escapements to indicate run strength:

- Time series analysis of total run to project post-weir run magnitude,
- Comparison of aerial survey data in the Clark River drainage and the Hatchery Beach area to aerial survey estimates from previous years,
- Interviewing commercial and subsistence users regarding the late season sockeye salmon run strength.
- Commercial and subsistence harvest CPUE, if avaiable.

Beginning September 15, commercial fishing periods in the Chignik Bay and Central Districts can be a maximum of 48 hours per week, and will be based on the evaluation of the sockeye salmon run strength and the Chignik Lake late season sockeye salmon subsistence needs (5 AAC 15.357). Post-September 14 management options include:

- Allow the maximum fishing time of 48 hours per week to be divided into one, two, three, or four commercial fishing periods, depending upon estimated sockeye and/or coho salmon escapements. For example, the fishing time could be distributed over 4 days with 12-hour fishing periods per day within a floating 7-day period,
- Allow a weekly fishing schedule of less than 48 hours, if the sockeye and or coho salmon run strength is determined to be weak,
- Allow for a complete closure.

Interviews of late season subsistence fishermen have indicated that an average of about 3,500 “red fish” (heavily water marked sockeye salmon harvested on the spawning grounds) were typically harvested in late fall and early winter in Chignik Lake. If projections indicate that this harvest level is not attainable, then actions restricting the commercial fishery shall occur.

After July, the Eastern District will be managed based on local pink, chum, and coho salmon abundance. Fishing time and areas will be based on actual escapement counts to local streams. Individual areas may be opened to directed fisheries if production surplus to escapement needs is evident in local areas. However, district-wide openings will not be allowed unless Chignik River sockeye salmon escapement objectives are expected to be met and overall pink and chum salmon abundance is sufficient to meet escapement objectives.

Until approximately August 20, the Western and Perryville Districts will be managed based on local pink and chum salmon abundance. Fishing time and areas will be based on actual pink and chum escapement counts to local streams. Individual areas may be opened to directed fisheries if production surplus to escapement needs is evident in local areas. However, district-wide openings will not be possible unless Chignik River sockeye salmon escapement objectives are expected to be met and overall pink and chum salmon abundance is sufficient to meet escapement objectives. After August 20, fishing time in the Western and Perryville Districts will be dependent on Chignik River sockeye salmon escapement and local coho salmon abundance.

2005 SUBSISTENCE SALMON FISHERY

All subsistence salmon fishermen must obtain a subsistence salmon permit for the 2005 season (Appendix F1). The permits will be available at the Chignik Weir and from several local vendors. It is imperative that users report their catches on the permit; these data are used by the department to assess the subsistence salmon fishery.

A person who does not hold a commercial salmon fishing license (CFEC permit or those with a 2005 crewmember license) may subsistence fish for salmon at any time. Commercial salmon license holders may subsistence fish for salmon during the commercial fishing season if the following conditions are met:

- A commercial salmon fishing license holder may not subsistence fish for salmon during the 24 hours before a commercial salmon fishing period or the 12 hours following the closure of a commercial salmon fishing period.
- Commercial salmon license holders wishing to subsistence fish for salmon during a commercial fishing period may do so if they register with the department at the Chignik weir by telephone (845-2243) or VHF radio (Ch. 6) prior to subsistence fishing for salmon. The adipose fin must be removed from all subsistence-caught salmon immediately upon capture. This provision is applicable no matter where the license holder intends to subsistence fish for salmon (e.g., Chignik Lake).
- A commercial license holder may not fish for both subsistence and commercial salmon at the same time. Further, a commercial salmon vessel may not carry both subsistence and commercially caught salmon at the same time.

The BOF opened the Chignik River to subsistence salmon fishing at their November 2004 meeting; however, the reach of river beginning 100 yards upstream of the Chignik weir to Chignik Lake will be closed to subsistence salmon fishing from July 1 to August 31 to protect spawning Chinook salmon. The reach of the Chignik River below the weir is open to subsistence salmon fishing year round. The Chignik River is closed to all fishing 100 yards upstream and downstream of the weir when the weir is installed.

Subsistence fishermen are reminded that purse-seine gear is not allowed for the taking of subsistence salmon in Chignik Lake. Also, all subsistence salmon fishing gear must be marked with a buoy listing the first initial and last name as well as the address of the person operating the gear (5 AAC 01.010 (h)), and that subsistence fishermen must carry their subsistence fishing permit with them while fishing.

TABLES AND FIGURES

Table 1.-Chignik River sockeye salmon escapement objectives, 2005.

Date	Escapement Lower		Upper	Date	Escapement Lower		Upper
June 2	500	-	1,000	August 3	4,500	-	10,500
June 4	2,000	-	3,000	August 6	8,250	-	21,750
June 6	5,000	-	7,000	August 9	15,000	-	30,000
June 8	10,000	-	14,000	August 12	22,500	-	37,500
June 10	20,000	-	25,000	August 15	30,000	-	45,000
June 12	30,000	-	40,000	August 18	37,500	-	52,500
June 14	50,000	-	70,000	August 21	45,000	-	60,000
June 16	75,000	-	110,000	August 24	53,250	-	66,750
June 18	125,000	-	160,000	August 27	64,500	-	70,500
June 20	175,000	-	220,000	August 31	75,000	-	75,000
June 22	225,000	-	275,000				
June 25	275,000	-	325,000	September 3	3,000	-	4,000
June 28	300,000	-	350,000	September 5	6,000	-	8,000
July 1	325,000	-	375,000	September 7	10,000	-	12,000
July 4	350,000	-	400,000 [a]	September 9	14,000	-	16,000
				September 11	18,000	-	20,000
July 6	5,000	-	10,000	September 13	22,000	-	23,000
July 8	15,000	-	20,000	September 15	25,000	-	25,000
July 10	30,000	-	40,000				
July 12	45,000	-	60,000	**Objectives through**			
July 14	56,000	-	75,000	**July 4:**	**350,000**	**-**	**400,000**
July 16	67,000	-	95,000				
July 19	86,000	-	115,000	**July 5 through Sept.**			
July 21	101,000	-	135,000	**15 Objectives:**	**250,000**	**-**	**300,000**
July 23	120,000	-	160,000				
July 26	135,000	-	180,000				
July 29	146,000	-	195,000				
July 31	150,000	-	200,000				

[a] Through July 4 is historically the date on which the inseason escapement most closely approximated the early-run escapement as estimated by post-season scale pattern analysis.

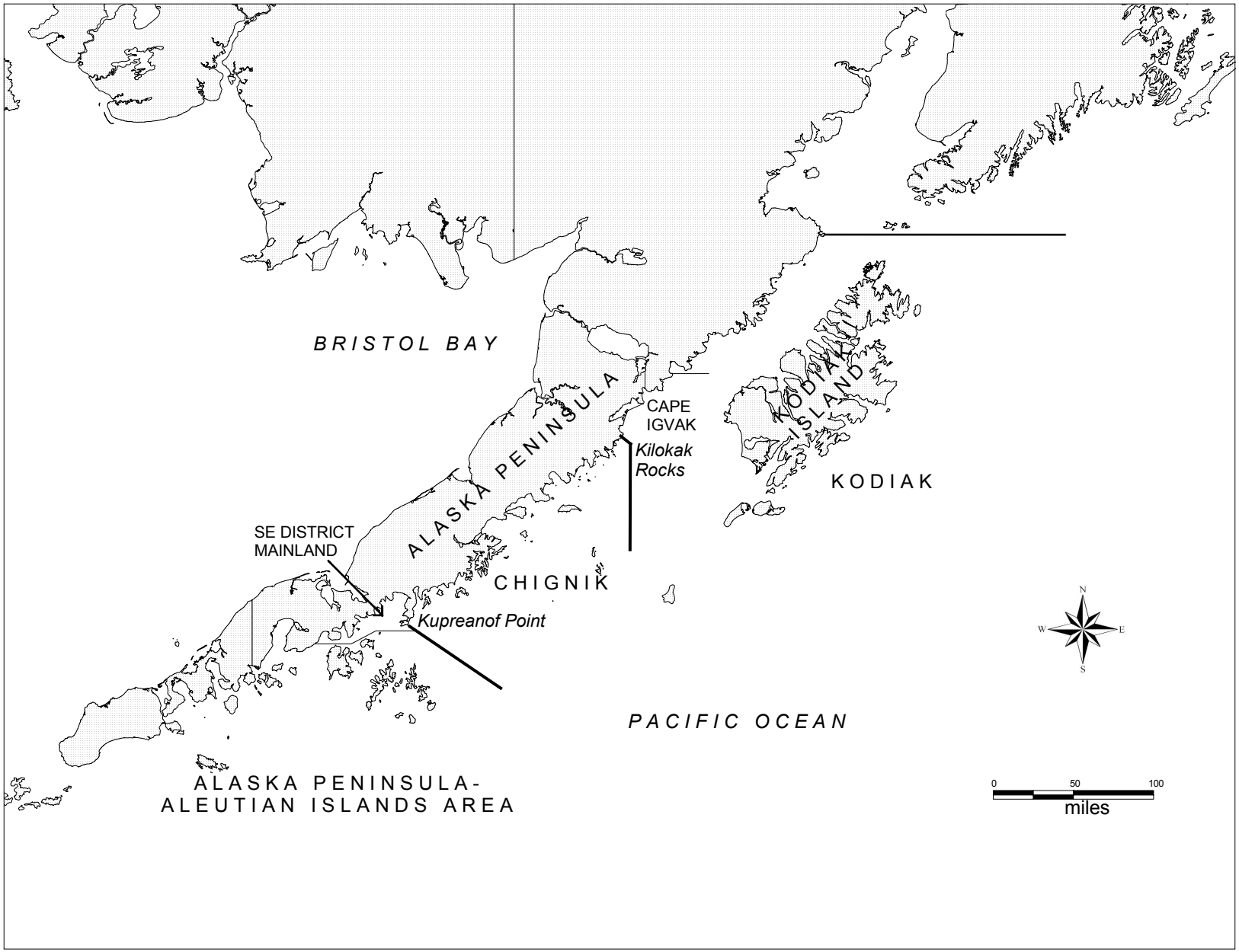

Figure 1.-Map of the Alaska Peninsula illustrating the relative locations of the Chignik, Kodiak, and Alaska Peninsula Management Areas.

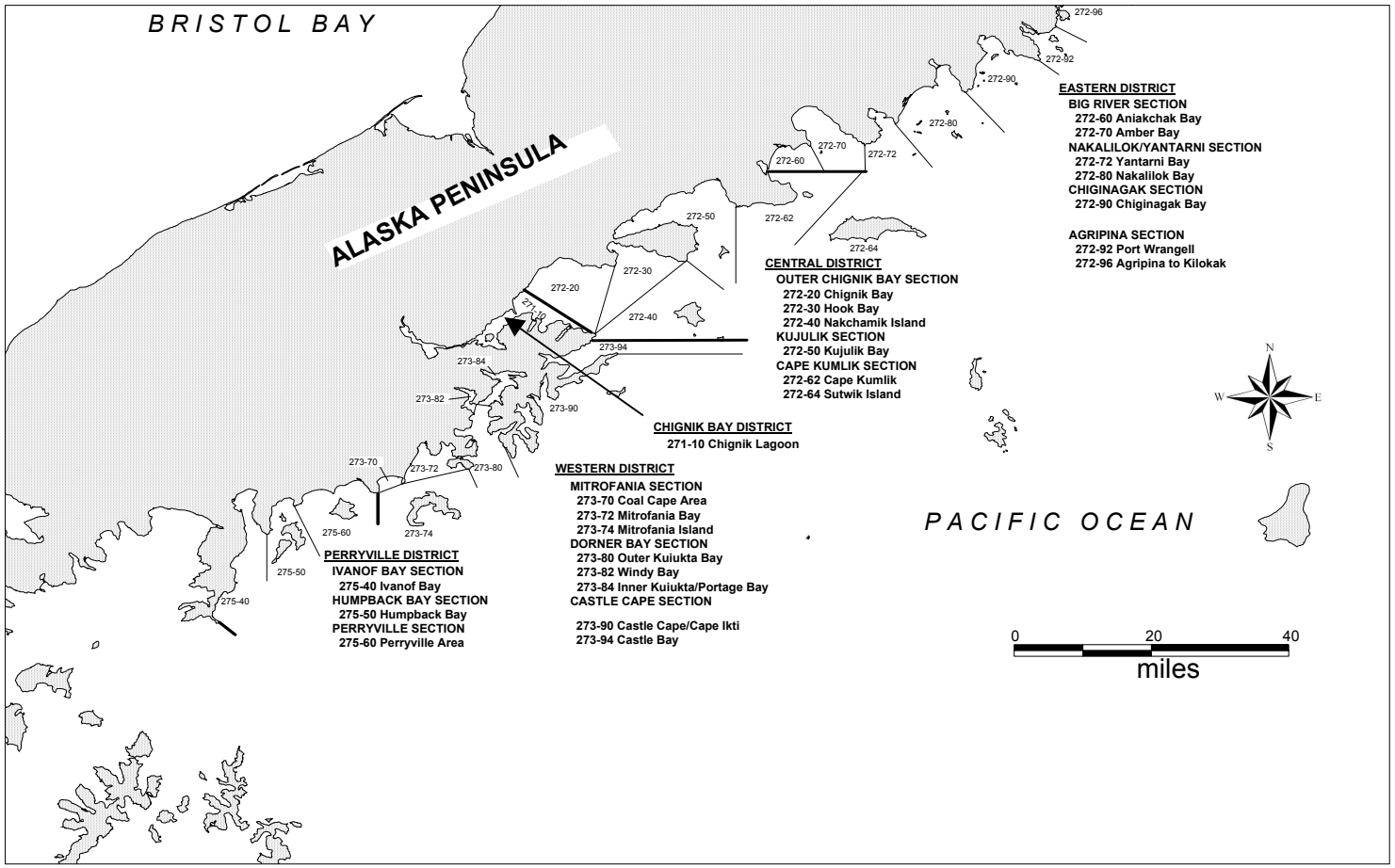

Figure 2.-Map of the Chignik Management Area illustrating district boundaries and statistical areas.

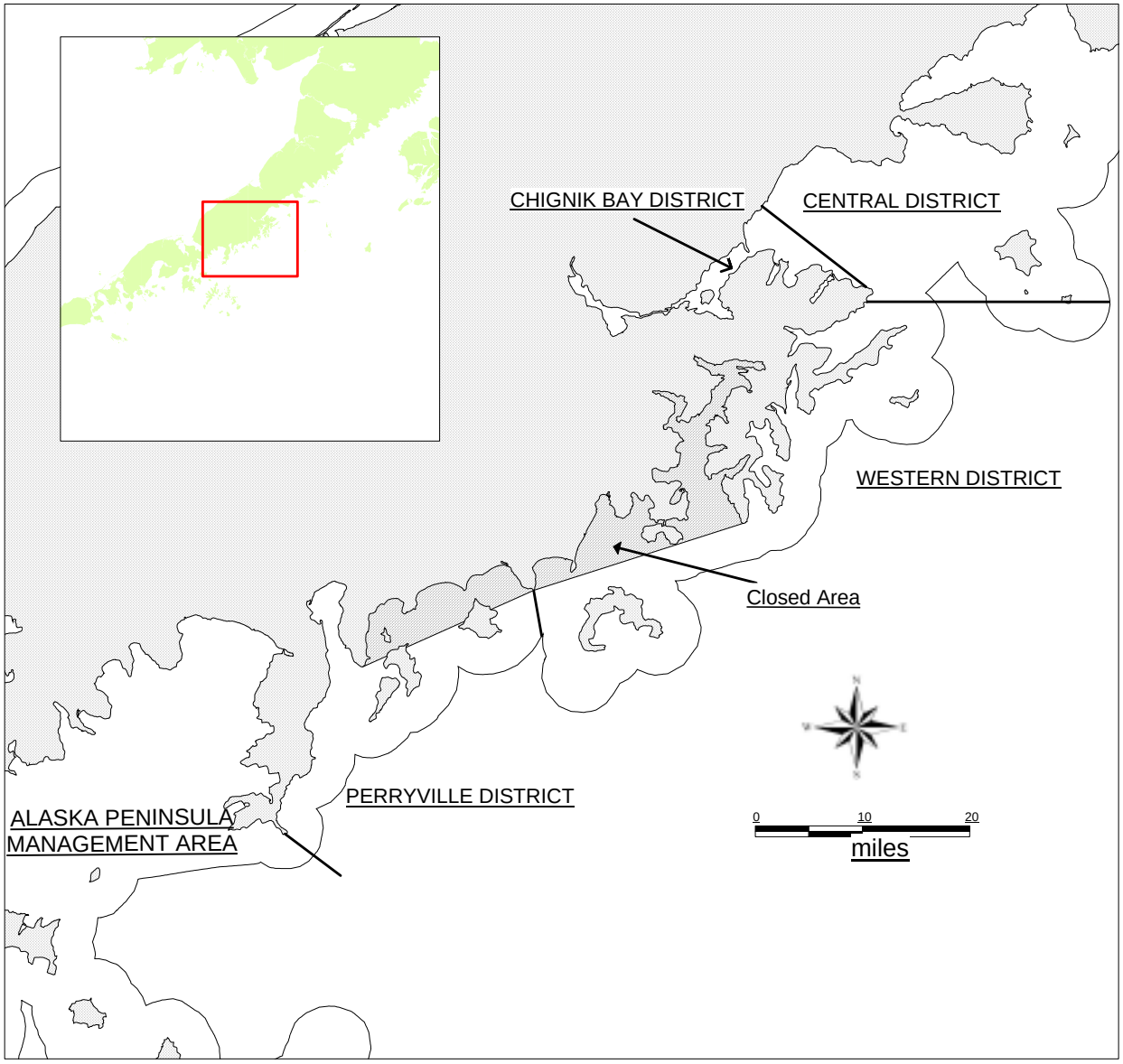

Figure 3.-Map depicting the "Cape Itki Line" in the Western and Perryville Districts.

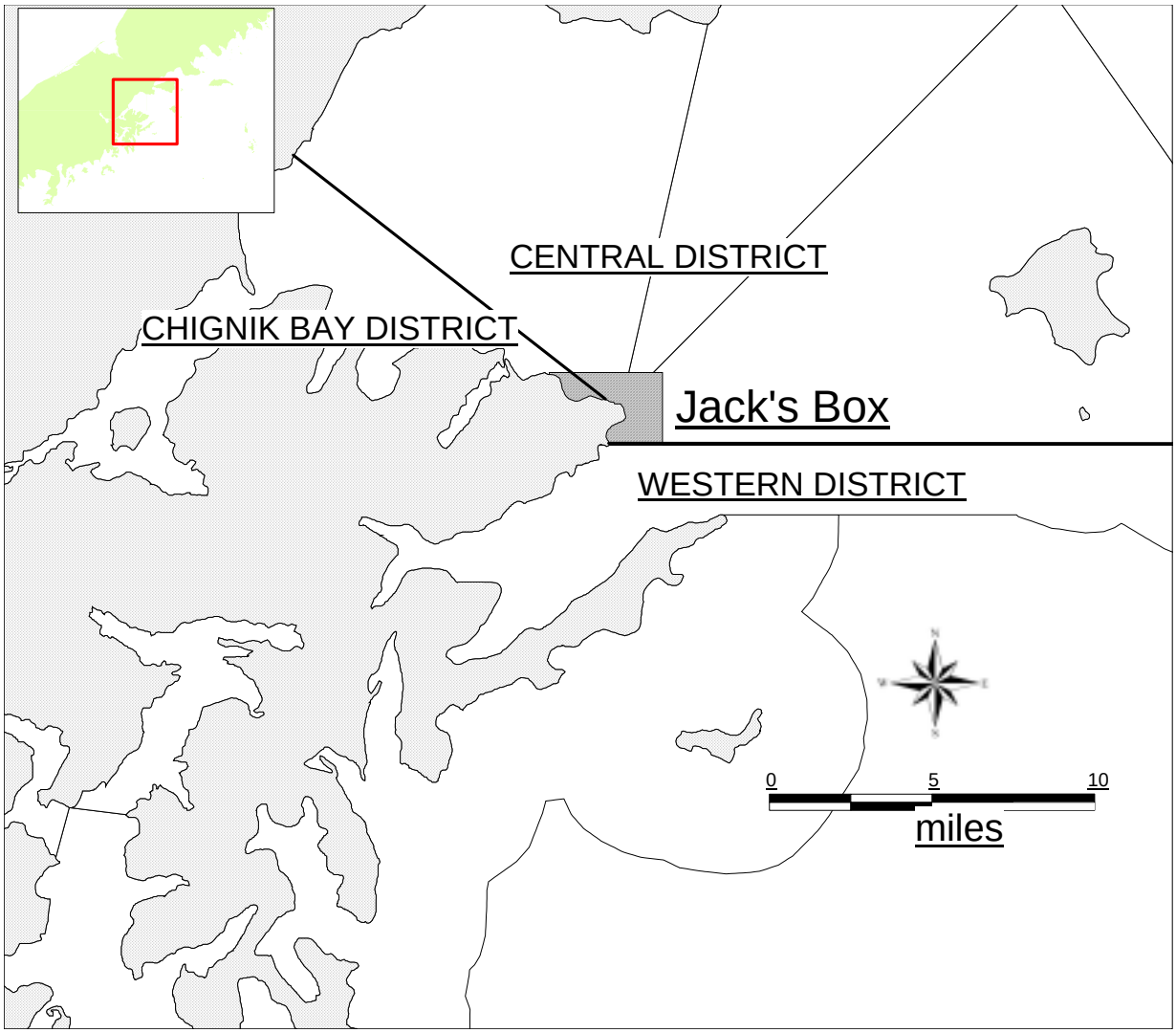

Figure 4.-Map depicting “Jacks Box” in the Chignik Bay, Central, and Western Districts.

APPENDIX A. COMMISSIONER'S PERMIT COOPERATIVE SALMON PURSE SEINE SPECIFICATIONS

Appendix A1.-2005 Chignik Management Area Commissioner's permit cooperative salmon purse seine specifications.

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

FRANK MURKOWSKI, GOVERNOR

211 Mission Road
Kodiak, AK 99615
PHONE: (907) 486-1825
FAX: (907) 486-1841
Or
Chignik Weir
PO 40 Chignik Lake, AK 99548
PHONE: (907) 845-2243
FAX: (907) 845-2235

2005 CHIGNIK MANAGEMENT AREA COMMISSIONER'S PERMIT
COOPERATIVE SALMON PURSE SEINE SPECIFICATIONS

NAME: Chignik Seafood Producers Alliance (CSPA) ADF&G # 2005-2

OPERATOR: Axel Kopun, President CSPA

ADDRESS: Summer: P.O. Box 30 Winter: PO Box 773173
Chignik Bay, AK 99564 Eagle River, AK 99577
phone: (907) 749-2204 phone: (907) 622-6226

In addition to current Chignik Management Area salmon commercial fishing regulations, participants agree to the following conditions for seine specifications and operations:

1) Permit is valid from 12:01 AM June 1, to MIDNIGHT October 31, 2005.

2) 5 AAC 15.359 (c) allows, through a commissioner's permit, for the CSPA to operate purse seines and hand purse seines in the Chignik Bay District:
   a) east of a line in Chignik Lagoon from 56° 20.528' N. lat., 158° 32.176' W. long. and 56° 19.365' N. lat., 158° 30.851'W.long., seines may not be less than 50 fathoms or more than 225 fathoms in length, and,
   b) west of a line in Chignik Lagoon from 56° 20.528' N. lat., 158° 32.176' W. long. and 56° 19.365' N. lat., 158° 30.851'W.long., seines may not be less than 50 fathoms or more than 125 fathoms in length, except,
   c) in the Mensis Point to Pillar Rock reach of the Chignik River: west of a line from Mensis Point at 56° 16.90' N. lat., 158° 38.51' W. long. to a point on the opposite shore of the Chignik River at 56° 16.56'N.lat., 158° 38.40' W. long. and east of a line from Pillar Rock (north shore) at 56° 16.74' N. lat., 158° 39.01' W. long and to a point on the opposite shore of the Chignik River (Pillar Rock south shore) at 56° 16.57' N. lat., 158° 38.84' W. long. seines may not be less than 50 fathoms or more than 175 fathoms.

3) No seine may be less than three fathoms stretch measure in depth nor more than 375 meshes in depth, including meshes used as chafing gear. The depth shall be determined by using a stretch measure of the web from the cork line to the bottom of the net, including any lines that hang below the lead line.

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4) Seine mesh may not be more than four and one-half inches stretch measure, except the first 25 meshes above the lead line may not be more than seven inches stretch measure.

5) In the Mensis Point to Pillar Rock reach of the Chignik River: the aggregate length of seine (up to 175 fathoms) and lead (up to 125 fathoms) may not be more than 300 fathoms.

6) When a purse seine or hand purse seine is in the water for the purpose of taking fish, the seine shall be attached to the licensed vessel operating the gear. Only the licensed vessel and any accompanying skiffs associated with the licensed vessel may be attached to the seine.

7) A purse seine and a hand purse seine are considered to have ceased fishing when the bunt end of the seine is attached to the purse seine vessel and the tow end of the seine is attached to the vessel or moving through the power block.

8) An ADF&G observer may sample and measure all catch and bycatch from the harvesting vessel's seine. The vessel operator and crew must exercise patience and slow the pace of fishing, if required, to accommodate the accurate collection of all data required from the ADF&G observer.

9) Where concurrent cooperative and competitive fishery openings occur in the Chignik Bay District, then seine regulations for all Chignik purse seine permit holders will revert to 5 AAC 15.332 (in the Chignik Bay District, purse seine and hand purse seines may not be less than 100 fathoms or more than 125 fathoms in length) except for the Mensis Point to Pillar Rock reach of the Chignik River where the cooperative fishery seines may not be less than 50 fathoms or more than 175 fathoms.

10) Provisions in item #9, above, will not apply in "Jack's Box" (5 AAC 15.357 (d)(2)(B)(iii)), when "Jack's Box" is also opened in conjunction with fishery openings in the Western and Perryville Districts.

11) At all times within "Jack's Box" (5 AAC 15.357 (d)(2)(B)(iii)), purse seine and hand purse seines may not be less than 100 fathoms or more than 125 fathoms in length.

12) Vessels must adhere to all commercial fishing and landing requirements.

13) The Chignik Seafood Processors Alliance is responsible for the actions of contractors, agents, or other persons who perform work to accomplish the goals of this permit and the cooperative fishery management plan, 5 AAC 15.359. The permittee shall notify ADF&G, Division of Commercial Fisheries, and obtain written approval in the form of a permit amendment before beginning any activity that significantly deviates from the approved plan and permits. Any action taken by the permittee or an agent of the permittee that increases the permit overall scope or that negates, alters, or minimizes the intent or effectiveness of any stipulation contained in this permit will be deemed a significant deviation from the approved plan. The final determination as to the significance of any

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Appendix A1.-(page 3 of 3)

deviation and the need for a permit amendment is the responsibility of ADF&G. Therefore, it is recommended that ADF&G, Division of Commercial Fisheries, be consulted immediately when a deviation from the approved permit is being considered.

14) This permit does not relieve the Chignik Seafood Processors Alliance, their contractors, agents, or other persons who perform their work from the responsibility for securing other permits: state, federal, or local.

15) This permit may be modified or voided by the ADF&G at any time.

I _____, for the Board of Directors of the Chignik Seafood Producers Alliance, hereby authorize the release of confidential fish ticket harvest information that results from my participation in the 2004 Chignik Management Area salmon fishery. I understand this information will be used for reporting of stock condition on Chignik Management Area salmon and any effects the lead may have on the salmon stocks and habitat in Chignik Lagoon. I also agree to abide by all permit terms stated above.

_____ _____

CHIGNIK SEAFOOD PRODUCERS ALLIANCE DATE

_____ _____

ADF&G REPRESENTATIVE DATE

APPENDIX B. 2005 CHIGNIK MANAGEMENT AREA COMMISSIONER'S PERMIT COOPERATIVE/PROCESSOR SALMON NET PEN REQUIREMENTS

Appendix B1.-2005 Chignik Management Area Commissioner's permit cooperative/processor salmon net pen requirements.

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

FRANK MURKOWSKI, GOVERNOR

211 Mission Road
Kodiak, AK 99615
PHONE: (907) 486-1825
FAX: (907) 486-1841
Or
Chignik Weir
PO 40 Chignik Lake, AK 99548
PHONE: (907) 845-2243
FAX: (907) 845-2235

2005 CHIGNIK MANAGEMENT AREA COMMISSIONER'S PERMIT
COOPERATIVE/PROCESSOR SALMON NET PEN REQUIREMENTS

NAME: Chignik Seafood Producers Alliance (CSPA) ADF&G # 2005-3

OPERATOR: Axel Kopun, President

ADDRESS:	Summer: P.O. Box 30	Winter: PO Box 773173
	Chignik, AK 99564	Eagle River, AK
	phone (907) 749-2204	phone (907) 622-6226

NAME: Norquest Seafoods Inc., Chignik

PROCESSOR: _____

ADDRESS:	Summer: P.O. Box 10	Winter: 5245 Shilshole Ave. NW
	Chignik, AK 99564	Seattle, WA 98107
	phone: (907) 749-2276	phone: (206) 281-7022

In addition to current Chignik Management Area salmon commercial fishing regulations, participants agree to the following conditions:

1) Permit is valid from 12:01 AM June 1, to MIDNIGHT October 31, 2005.

2) 5 AAC 15.359 (h) allows, through a commissioner's permit, the use of net pens to hold live, commercially captured salmon; thus net pens, except those in Chignik Lagoon allowed under permit ADF&G # 2005-4, will only be allowed under provisions of this permit. Fishing and tendering vessels (i.e., vessels that operate under their own power, that have a licensed skipper aboard, and with fish holds that are not directly open to the sea) may contain live fish, for up to three days after their capture, without the need of a commissioner's permit.

3) The Chignik Seafood Producers Alliance (CSPA) will notify the Chignik ADF&G when fish pens are deployed and when they contain fish, except for fish pens that are attached to the Norquest Seafoods Inc., facilities or a mooring owned by Norquest Seafoods Inc.,

-continued-

in Anchorage Bay (56° 18'N.lat., 158° 24'W. long), Chignik. CSPA will provide Chignik ADF&G a daily estimate of the number and pounds of salmon, by species, in each fish pen.

4) Norquest Seafoods Inc., will notify the Chignik ADF&G when fish pens are attached to their dock or any mooring owned by Norquest Seafoods. Norquest Seafoods will provide Chignik ADF&G a daily estimate of the number and pounds of salmon, by species, in each fish pen.

5) This permit allows the use of fish pens for holding live salmon for up to three days after being captured in the Chignik District commercial salmon fishery. The net pens may be moored in Anchorage Bay. Towing pens that contain live salmon caught in the Chignik District, within the Chignik District is allowed.

6) A total of up to eight fish pens will be allowed in the Chignik Bay District. Individual fish pens may be up to 40 feet in length, 40 feet in width, and 100 meshes deep. The fish pen mesh size may be no greater than four inches. Lights, decks, fences, and other structural supports may be attached to the fish pens. The fish pens may be attached to each other.

7) An ADF&G observer may sample and measure all catch and bycatch contained in the fish pens. The fish pen operator and crew must exercise patience and slow the pace of processing, if required, to accommodate the accurate collection of all data required from the ADF&G observer.

8) Catcher, tender, and processing vessels must adhere to all other commercial fishing and landing requirements.

9) The Chignik Seafood Processors Alliance and Norquest Seafoods Inc., Chignik is responsible for the actions of contractors, agents, or other persons who perform work to accomplish the goals of this permit. The permittee shall notify ADF&G, Division of Commercial Fisheries, and obtain written approval in the form of a permit amendment before beginning any activity that significantly deviates from the approved plan and permits. Any action taken by the permittee or an agent of the permittee that increases the permit overall scope or that negates, alters, or minimizes the intent or effectiveness of any stipulation contained in this permit will be deemed a significant deviation from the approved permit. The final determination as to the significance of any deviation and the need for a permit amendment is the responsibility of ADF&G. Therefore, it is recommended that ADF&G, Division of Commercial Fisheries, be consulted immediately when a deviation from the approved permit is being considered.

10) This permit does not relieve the Chignik Seafood Processors Alliance or Norquest Seafoods Inc., Chignik, their contractors, agents, or other persons who perform their work from the responsibility for securing other permits: state, federal, or local.

11) All fish in a fish pen are considered harvested for all catch reporting and allocative concerns.

-continued-

CSPA/Norquest Fish Pen Agreement 3

12) This permit may be modified or voided by the ADF&G at any time.

I _____, for the Board of Directors of the Chignik Seafood Producers Alliance, hereby authorize the release of confidential fish ticket harvest information that results from my participation in the 2005 Chignik Management Area salmon fishery. I understand this information will be used for reporting of stock condition on Chignik Management Area salmon. I also agree to abide by all permit terms stated above.

_____ _____
CHIGNIK SEAFOOD PRODUCERS ALLIANCE DATE

_____ _____
PROCESSOR-NORQUEST SEAFOODS INC. DATE

_____ _____
ADF&G REPRESENTATIVE DATE

APPENDIX C. 2005 CHIGNIK MANAGEMENT AREA COMMISSIONER'S PERMIT COOPERATIVE SALMON FIXED LEADS

Appendix C1.-2005 Chignik Management Area Commissioner's permit cooperative salmon fixed leads.

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

FRANK MURKOWSKI, GOVERNOR

211 Mission Road
Kodiak, AK 99615
PHONE: (907) 486-1825
FAX: (907) 486-1841
Or
Chignik Weir
PO 40 Chignik Lake, AK 99548
PHONE: (907) 845-2243
FAX: (907) 845-2235

2005 CHIGNIK MANAGEMENT AREA COMMISSIONER'S PERMIT
COOPERATIVE SALMON FIXED LEADS

NAME: Chignik Seafood Producers Alliance (CSPA) ADF&G # 2005-1

OPERATOR: Axel Kopun, President CSPA

ADDRESS: Summer: P.O. Box 30 Winter: PO Box 773173
Chignik Bay, AK 99564 Eagle River, AK 99577
phone: (907) 749-2204 phone: (907) 622-6226

In addition to current Chignik Management Area salmon commercial fishing regulations, participants agree to the following conditions:

1) Permit is valid from 12:01 AM June 1, to MIDNIGHT October 31, 2005.

2) 5 AAC 15.359 (c) allows, through a commissioner's permit, for CSPA to operate two fixed leads in the Chignik Management Area located in Chignik Lagoon.

3) The area between the Mensis Point (5 AAC 15.350 (1)(C)) and the Pillar Rock (5 AAC 15.350 (1)(D)) markers shall be known as the "Pillar Rock Harvest Area". One lead may be attached to the beach at approximately the high tide mark at approximately 56° 16.74' N. lat., 158° 39.01'W. long., and a second lead may be attached to the beach at approximately the high tide mark at approximately 56° 16.57' N. lat., 158° 38.84' W. long. within the Pillar Rock Harvest Area.

4) (a) The lead attached to the Mensis Point shoreline may be up to 225 fathoms in length and no more than 100 meshes in depth. A purse seine may not be attached to this lead.

(b) The lead attached to the Pillar Rock shoreline may be up to 125 fathoms in length and may be no more than 100 meshes in depth. A purse seine may be attached to this lead.

5) Each lead shall be made of seine webbing, with meshes no greater than 4 inches stretch measure.

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6) Each lead must have a corkline and a leadline and may be anchored at appropriate intervals for the purpose of holding its position.

7) A distance of at least 100 feet of open space must always be provided for between the leads in the main channel of the river as measured at the upstream-most corners of the leads. There may be less than 100 feet of open space between the leads and purse seine gear provided that access for vessel traffic is maintained.

8) Each lead corkline must have operating white lights at night every ten fathoms along the entire length of the corkline, and have appropriate operating port (red) and starboard (green) lights on the seaward end of the leads to mark the navigable channel between the leads.

9) The ADF&G may verbally request the removal of the leads at any time; upon the removal request by ADF&G, the operator must completely remove the leads from the water within two hours.

10) The leads may be installed in the water at the beginning of each cooperative fishing period. The leadline of each lead shall be raised from the bottom and secured to the corkline in at least five places prior to the closure of each cooperative fishing period.

11) At night when a purse seine is attached to a lead, the vessel must display an appropriate red mast light to indicate fishing or a white light to indicate anchoring and there must be at least two white lights placed along the purse seine between the purse seine vessel and the lead.

12) In the Chignik Management Area, a vessel may have a purse seine or hand purse seine aboard as described in 5 AAC 15.332 and a total of two fixed leads aboard as they are described in this permit.

13) When the ADF&G restricts the salmon catch of the cooperative by imposing a daily harvest limit, the cooperative may fully deploy the leads at 12:01 AM of the harvest limit day. When the ADF&G daily harvest limit has been harvest, the cooperative must minimize impediments to fish migrations by tying the lead leadline to the corkline.

14) An ADF&G observer may sample and measure all catch and bycatch of the leads and the harvesting vessel's seine. The vessel operator and crew must exercise patience and slow the pace of fishing, if required, to accommodate the accurate collection of all data required from the ADF&G observer.

15) Participants will notify ADF&G in Chignik daily prior to commencement of lead operation and at the conclusion of lead operation.

16) The Chignik Seafood Producers Alliance will provide ADF&G a logbook for each lead specifying, on a daily basis, the time each lead is fishing, repairs, alterations, maintenance (cleaning), and other data as requested by ADF&G.

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17) Vessels must adhere to all commercial fishing and landing requirements.

18) The Chignik Seafood Processors Alliance is responsible for the actions of contractors, agents, or other persons who perform work to accomplish the goals of this permit and the cooperative fishery management plan, 5 AAC 15.359. The permittee shall notify ADF&G, Division of Commercial Fisheries, and obtain written approval in the form of a permit amendment before beginning any activity that significantly deviates from the approved plan and permits. Any action taken by the permittee or an agent of the permittee that increases the permit overall scope or that negates, alters, or minimizes the intent or effectiveness of any stipulation contained in this permit will be deemed a significant deviation from the approved plan. The final determination as to the significance of any deviation and the need for a permit amendment is the responsibility of ADF&G. Therefore, it is recommended that ADF&G, Division of Commercial Fisheries, be consulted immediately when a deviation from the approved permit is being considered.

19) This permit does not relieve the Chignik Seafood Processors Alliance, their contractors, agents, or other persons who perform their work from the responsibility for securing other permits: state, federal, or local.

20) When the leads are deployed in any manner a cooperative CFEC permit holder must be present at all times within the Pillar Rock Harvest Area.

21) This permit may be modified or voided by the ADF&G at any time.

I _____, for the Board of Directors of the Chignik Seafood Producers Alliance, hereby authorize the release of confidential fish ticket harvest information that results from my participation in the 2004 Chignik Management Area salmon fishery. I understand this information will be used for reporting of stock condition on Chignik Management Area salmon and any effects the lead may have on the salmon stocks and habitat in Chignik Lagoon. I also agree to abide by all permit terms stated above.

_____ _____

CHIGNIK SEAFOOD PRODUCERS ALLIANCE DATE

_____ _____

ADF&G REPRESENTATIVE DATE

APPENDIX D. 2005 CHIGNIK SOCKEYE SALMON FORECAST

Appendix D1.-2005 Chignik sockeye salmon forecast.

Preliminary Forecast of the 2005 Run		Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION			
Early Run (Black Lake)	Total Run Estimate	1,840	1,060–2,760
	Escapement Goal	350	350–400
	Harvest Estimate[a]	1,490	
Late Run (Chignik Lake)	Total Run Estimate	552	285–1,086
	Escapement Objective[b]	250	250–300
	Harvest Estimate	302	
Total Chignik System	Total Run Estimate	2,390	
	Escapement Objective[b]	600	1,350–3,850
	Harvest Estimate[a]	1,790	600–700

[a] These figures include harvests of Chignik-bound sockeye salmon from the Southeastern District Mainland and the Cape Igvak fisheries; approximately 1,430 thousand sockeye salmon are projected to be harvested in the Chignik Management Area.

[b] The Chignik Lake late run escapement goal is 200,000 sockeye salmon, resulting in an escapement goal for the entire run of 550,000. However, managers try to achieve an additional escapement objective of 50,000 sockeye salmon in August and September.

Forecast Methods

The forecasts for the 2005 early and late Chignik sockeye salmon runs were based on available data from 1977 to the present. Simple linear regressions were modeled using sibling, outmigration year, escapement age class, temperature data and year class return relationships. Each regression model was assessed with standard regression diagnostic procedures. Regression models were only used in cases where the slope of the regression was significantly different from zero ($P < 0.25$). The variance of each estimate was calculated from the error structure of the regression. Prediction intervals were estimated at a coverage probability of 80 percent. Median estimators were used to estimate production of age classes where regression relationships were not significant.

The predicted early-run age-1.3 and -2.3 returns were estimated based on the abundance of their sibling returns (1.2 and 2.2) in 2004. Following non-significant regression results, the median brood year return by total age was used to estimate all other early-run age class components (i.e., ages 0.2, 1.1, 0.3, 1.2, 2.1, 2.2, 1.4, 3.2, 2.4, 3.2).

Ocean age class relationships and temperature indices were analyzed for the late run. Ocean age 2 (2-ocean) sockeye salmon were predicted from prior year 1-ocean returns and a temperature index, using multiple linear regression, ($P = 3.5\times10^{-5}$). Ocean age three (3-ocean sockeye) were predicted by regressing the ratio between 2- and 3-ocean fish (same outmigration year) on a temperature index (P = 0.01). The temperature index was constructed using the average winter temperature (October through May) prior to sockeye salmon outmigration and the average summer temperature (June through September) after outmigration. Temperature data were obtained from the Cold Bay Airport climate database. Estimates of variance were calculated from each regression. Both 1-ocean and 4-ocean sockeye salmon were predicted by calculating the median return and prediction intervals were calculated using the 10^{th} and 90^{th} percentiles of the returns. The variances associated with individual regression estimates by age class were

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summed to calculate 80 percent prediction intervals. Regression and median estimates were summed to estimate the total Chignik watershed sockeye salmon run for 2005; 80 percent prediction intervals for the total run were calculated by combining the regression and median prediction intervals.

The total early- and late-run forecasts were calculated by summing individual and pooled age class estimates. When the median returns by age class were used, the 10^{th} and 90^{th} percentiles of the data were used to describe the range of the data. The variances associated with individual estimates were summed to estimate 80 percent prediction intervals, which were then added to the percentile estimates to calculate the forecast ranges.

Forecast Discussion

The 2005 sockeye salmon run to the Chignik River is expected to be approximately 2.4 million fish. The early run is expected to be approximately 1.8 million fish. The late run is expected to be approximately 552 thousand fish. The 2005 sockeye salmon run to Chignik is expected to be approximately 111 thousand fish less than the recent 10-year average run (2.5 million) and 900 thousand fish greater than the 2004 run (1.5 million).

Approximately 88 percent of the 2005 early run was estimated using sibling relationships. Using similar methods, the 2004 early run was overestimated by approximately 14 percent. Approximately 98 percent of the 2005 late run was estimated using simple linear and multiple regression relationships incorporating temperature indices. Climate indices have not been used before in forecasting the Chignik late run. Rather, in the past, median estimators have typically been used due to poor sibling relationships.

Available smolt data were analyzed and significant multiple regression relationships were found between the total number of outmigrating age-1. and -2. smolt and subsequent 2- and 3-ocean returns (about 98 percent of the run). This estimate was then expanded proportionally to account for other ocean ages not calculated by the multiple regressions. In 2003, returns predicted by simple regression underestimated the total run by about 9 percent. In 2004, a similar simple regression method overestimated the total run to Chignik by 1.6 million fish. The smolt-based forecast of the 2005 Chignik total sockeye salmon run is 1.3 million sockeye salmon, which is substantially lower (1.1 million) than that predicted from sibling relationships and median estimates.

The disparity between the smolt forecast and the sibling forecast suggest the actual run may fall in the lower half of the forecast range. Given this ancillary information, our confidence in this forecast is fair.

The projected harvest estimate for the early run of 1.5 million fish is based on achievement of the lower end of the early run escapement goal range of 350 thousand fish. The projected late-run harvest estimate of 302 thousand is based on the achievement of the lower end of the late run escapement objective range of 250 thousand fish through September 15. Harvest estimates for both the early- and late-run include Chignik bound sockeye salmon harvested in the Cape Igvak Section of the Kodiak Management Area and the Southeastern District Mainland of the Alaska Peninsula Management Area.

Heather Finkle, Finfish Research Biologist, Alaska Peninsula
M .B. Foster, Finfish Research Biologist, Kodiak

APPENDIX E. 2005 CHIGNIK TARGET ESCAPEMENT LEVEL MEMORANDUM

Appendix E1.-2005 Chignik target escapement level memorandum.

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

MEMORANDUM

TO: Patti Nelson
Regional Finfish Research Supervisor
Division of Commercial Fisheries
Region IV – Kodiak
and
Jim McCullough
Regional Finfish Management Supervisor
Division of Commercial Fisheries
Region IV – Kodiak

DATE: April 11, 2005
PHONE: (907) 486-1805
FAX: (907) 486-1841

THRU: Mark Witteveen
Finfish Research Biologist
Division of Commercial Fisheries
Region IV – Kodiak
and
Kenneth Bouwens
Chignik Area Management Biologist
Division of Commercial Fisheries
Region IV – Kodiak

FROM: Heather Finkle
Finfish Research Biologist
Division of Commercial Fisheries
Region IV - Kodiak

SUBJECT: Chignik River Watershed Biological Escapement Goal Recommendation

The purpose of this memorandum is to discuss the current escapement goals to the Chignik River watershed in terms of the health of the sockeye salmon rearing habitat in Chignik and Black Lakes. This discussion is based on preliminary data from the Chignik Lakes Ecological Assessment Project, the Chignik Smolt Enumeration Project and recent Board of Fisheries (BOF) changes to management objectives.

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Changes to the Chignik River watershed biological escapement goals (BEGs) and management objectives should be noted first. Through the 2004 field season, the early run (Black Lake) BEG was 350,000-400,000 and, the late run BEG was 200,000-250,000 with an additional September management objective of 25,000 fish. The November 2004 BOF meeting did not change the goal ranges. It did, however, reclassify the BEGs as sustainable escapement goals (SEGs) and added an additional 25,000 fish August management objective, yielding a total late run (Chignik Lake) escapement and management objective range of 250,000 to 300,000 sockeye salmon.

Respective to the past BEGs, total sockeye salmon escapement estimates have been in excess of the goal ranges for 12 of the past 13 years (1992 – 2004; Table 1). With the exception of 2004, the early run escapements have been closer to the established BEGs than the late run escapements. From 2002 to 2004, the lower end of the BEGs were targeted for both early and late runs. In 2002, regardless of this effort, the total late run escapement exceeded the upper end of the BEG by almost 100,000 sockeye salmon. In 2003 the early run escapement estimate barely exceeded the lower end of the BEG although the late run escapement exceeded the upper end of the BEG. In 2004, escapements for both runs fell within the lower end of their respective BEGs, however, the late run did not fulfill its September management objective of 25,000 fish. The cumulative sockeye salmon escapement to the Chignik River watershed in 2004 was the lowest that it has been since 1992.

Table 1. Sockeye salmon escapements in the Chignik River watershed from 1992 to 2004.

	Early Run Escapement	Late Run Escapementa	Total Escapementa
Goal	350,000 - 400,000	225,000 - 275,000a	575,000 - 675,000a
Year			
1992	360,681	403,755	764,436
1993	364,263	333,114	697,377
1994	769,464	197,445	966,909
1995	366,163	373,757	739,920
1996	464,750	284,387	749,137
1997	396,668	378,950	775,618
1998	410,659	290,469	701,128
1999	457,425	258,541	715,966
2000	519,661	285,614	805,275
2001	744,013	392,905	1,136,918
2002	380,701	344,519	725,220
2003	350,004	334,119	684,123
2004	363,800	214,459	578,259

aIncludes September 25,000 fish management objective.

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Fluctuations in escapement and their subsequent smolt production can greatly affect juvenile fish life history strategies. Zooplankton are the forage base for juvenile sockeye salmon, and a high abundance of juvenile sockeye salmon, resulting from high escapement levels, can negatively impact the juvenile sockeye salmon food supply. The zooplankton community is a complex, dynamic web of different species that are susceptible to different grazing pressures. The abundance, species composition, and even size of the zooplankton can change via either bottom-up pressures such as nutrient limitations and phytoplankton species composition or from top-down pressures from extensive grazing (Kerfoot 1987; Kyle 1996). Preliminary limnology data collected in 2000 through 2004 indicated that the forage base has been overgrazed in both Black and Chignik Lakes (Finkle and Bouwens 2001; Bouwens and Finkle 2003; Finkle *in prep*). In the Chignik River watershed, top-down pressures appear to be regulating the zooplankton population as evidenced by:

1) Zooplankton species composition: High grazing pressure on zooplankton can cause a shift in zooplankton abundance and species composition to fewer and less nutritional species of sockeye salmon forage (Kerfoot 1987; Koenings and Burkett 1987). This seems to have occurred in both Black and Chignik Lakes in 2000 through 2004 compared to data taken in 1991 (Kyle 1992). From 2000 to 2004, *Bosmina* and *Cyclops* predominated the zooplankton species composition in both lakes. Both of the dominant species are inefficient grazers on phytoplankton, and are poor transmitters of energy and nutrients through the food web. Although juvenile sockeye salmon do prey upon *Bosmina* and *Cyclops*, they are not preferred sockeye salmon forage. *Daphnia* are the preferred species, which were nearly absent in both lakes from 2000 through 2002, and 2004. However, *Daphnia* were more abundant in Chignik Lake in 1991 and 2003, which both followed years when total escapements for each run were closer to their BEGs. Although the dominant zooplankton species composition still varied in 2003, the increase in *Daphnia* abundance may also suggest that top-down pressures on the preferred juvenile sockeye salmon forage, and thus the zooplankton community, were reduced. Further, rotifers, a type of smaller zooplankton unavailable as juvenile sockeye salmon forage, have been very abundant in recent years. Rotifers, it should be noted, make energy and nutrients unavailable to sockeye salmon because they are not a prey item.
2) Zooplankton size: The size of individual zooplankton (especially *Bosmina*) can change in response to high grazing pressure. The mean size of the *Bosmina* in both lakes was very small and below the elective feeding size threshold of sockeye salmon in 2000 through 2004. The zooplankton were generally larger, by species, in 1991 (Kyle 1992).
3) Zooplankton Biomass: The average 2000 through 2004 weighted mean zooplankton biomass (regardless of species or size) in Chignik Lake was about 436 mg/m2. In 2001, the weighted mean biomass in Chignik Lake was very low (170 mg/m2). In 2004, zooplankton biomass was 467 mg/m2. For comparison, the weighted mean biomass of Chignik Lake in 1991 was 916 mg/m2. Edmundson and Mazumder (2001) suggested that juvenile sockeye salmon are

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starving when zooplankton biomass levels approach about 100 mg/m2 and that they are fully satiated at levels above 1,000 mg/m2. Despite the increase in zooplankton biomass from 2001 to 2004, the 2004 biomass level is still considered low.

4) Phytoplankton abundance: Phytoplankton is the forage of zooplankton. Chlorophyll *a* is used as an indicator of phytoplankton production as it is a necessary component of phytoplankton respiration. High chlorophyll-*a* levels and nutrient data indicated that the Chignik watershed was not limited by nutrient abundance from 2000 to 2004. Chlorophyll-*a* levels were extremely high in both lakes from 2000 to 2002 and in 2004. This indicates that a zooplankton community is unable to transfer the energy and nutrients from the phytoplankton to sockeye salmon, indicating a bottleneck through top-down limitations of zooplankton production (Bouwens and Finkle 2003). Therefore, based on chlorophyll-*a* levels, the primary production of the system was high, but it was not transferred up the food web to juvenile sockeye salmon. In 2003, chlorophyll-*a* levels were lower and comparable to other Alaska Peninsula lakes (Finkle *in prep*), which suggests that phytoplankton were more efficiently consumed by zooplankton. This may also suggest that grazing pressure was less in 2003 relative to more recent years (Finkle *in prep*). The high chlorophyll-*a* levels in 2004 suggest that zooplankton were overgrazed in both lakes.

5) Stomach content analysis: Preliminary juvenile sockeye salmon stomach content analysis from 2001 and 2002 suggested that prey items other than zooplankton have been a major portion of the diet of rearing sockeye salmon in Black Lake, Chignik River, and Chignik Lagoon. The alternative prey included insects and amphipods. These prey were relatively less important in 2002 (when there was a higher zooplankton abundance and biomass) than in 2001, indicating that they might be chosen secondarily if zooplankton are not available. Stomach content data were not collected in 2003 or 2004.

6) Juvenile sockeye salmon catch data: Juvenile sockeye salmon were sampled in Black Lake, Black River, Chignik Lake, Chignik River, and Chignik Lagoon in 2000 through 2003. Juvenile sockeye salmon sampling was reduced to Black Lake, Chignik River, and Chignik Lagoon in 2004. These data are not yet fully analyzed, but preliminary analyses indicate that the majority of the young-of-the-year-juvenile sockeye salmon emigrate from Black Lake to Chignik Lake during July and August of each year. This has been consistent with findings of studies over 30 years ago by Parr (1972) and Narver (1966) and more recent work by Ruggerone (1994). Therefore, it appears that Chignik Lake is an important rearing area for both stocks. We were unable to derive juvenile sockeye salmon abundance estimates; thus, catch rates were used as an indicator of relative abundance. During years when juvenile sockeye salmon catch rates in Chignik Lake were high (especially 2001) zooplankton biomass was low. Further, the catch rates of juvenile sockeye salmon in Chignik River and Chignik Lagoon were higher than in Chignik Lake in 2001. This suggests that the juvenile sockeye salmon were forced to utilize alternative habitats when the zooplankton population was overtaxed.

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Data from the Chignik smolt project (Bouwens and Newland 2003; Finkle and Newland *in prep)* also indicate that the number of juvenile sockeye salmon rearing in the freshwater ecosystem may have been too high. About 6.75 million smolt emigrated in 2003 and 8.66 million smolt emigrated in 2004. Compared to an average of about 20 million smolt per year from 1997 through 2002, these were two of the three lowest estimations of juvenile sockeye salmon outmigration from the watershed. The proportion of age 2. smolt in the emigration has dropped over the last few years. The smolt that would have emigrated in 2003 as age 2. smolt experienced very poor feeding conditions in 2001 and only slightly better conditions in 2002 in Chignik Lake. This is further evidenced by the lack of an age 3. component from 2002 and 2003 sample catches. Similar circumstances existed for age 2. smolt rearing in 2002 and 2003. The freshwater survival of juvenile sockeye salmon may have been low in recent years because of low food availability due to overgrazing.

Recent changes to late run management objectives must also be considered when targeting escapements for the Chignik sockeye salmon stocks. Considering the Chignik Lakes Ecological Assessment and Chignik Smolt Enumeration Project data and the increase in the late run management objectives, it is recommended that management staff target the low end of both the early run (350,000 fish) and late run (250,000) escapement objectives. The goal of reducing the number of sockeye salmon fry in both lakes was implemented from 2002 to 2004 to relieve the top-down pressure on the zooplankton population and subsequently this recommendation is expected to increase the overall ecological health of the system in terms of sockeye salmon production. This protocol is still relevant as Black Lake juvenile sockeye salmon, which rear and compete in Chignik Lake, can deplete the forage base shared by both stocks. The effects of the targeted lower escapement goal ranges in 2003 and 2004 will not be reflected in the Chignik Lakes Ecological Assessment data until the young-of-the-year sockeye salmon have reared in the watershed and in subsequent adult returns until 2008. Thus, it is recommended to continue targeting the lower ends of the Black and Chignik Lakes escapement objectives.

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cc: Lloyd
Poetter

APPENDIX F. CHIGNIK SALMON SUBSISTENCE PERMIT

Appendix F1.-2005 Chignik salmon subsistence permit.

2005
CHIGNIK SALMON SUBSISTENCE PERMIT

NAME: _____

SUMMER ADDRESS: _____

_____

WINTER ADDRESS: _____

_____

LIMIT TO NUMBERS OF SALMON TAKEN: 250

I CERTIFY THAT I HAVE RESIDED IN ALASKA FOR TWELVE (12) CONSECUTIVE MONTHS

_____ / _____
(PERMITTEE SIGNATURE) **(DATE)**

ISSUED BY: _____ / _____
(ADF&G VENDOR SIGNATURE) **(DATE)**

SUBSISTENCE HARVEST LOG FOR 2005							
TRIP DATE		NUMBER OF SALMON HARVESTED BY SPECIES					
Day/ Month	SPECIFIC LOCATION	KINGS	SOCKEYE	COHO	PINK	CHUM	TOTAL

THIS PERMIT IS VALID FROM DATE OF ISSUE TO DECEMBER 31, 2005

PLEASE RETURN THIS PERMIT (WITH YOUR HARVEST RECORD) BY DECEMBER 31, 2005!
TO:
LISA SCARBROUGH
ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
333 RASPBERRY ROAD
ANCHORAGE, AK 99518-1599

(SEE SUBSISTENCE REGULATIONS ON BACK)

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SELECT SUBSISTENCE FISHING REGULATIONS

5 AAC 01.015. SUBSISTENCE FISHING PERMITS AND REPORTS. (b)(3) Permits must be retained in the possession of the permittee and be readily available for inspection while taking fish. A person who transports subsistence-taken fish shall have a subsistence fishing permit in their possession.

5AAC 01.450. DESCRIPTION OF CHIGNIK AREA. The Chignik Area includes all waters of Alaska on the south side of the Alaska Peninsula bounded by a line extending 135° southeast for three miles from a point near Kilokak Rocks at 57° 10.34' N. lat., 156° 20.22' W. long. (the longitude of the southern entrance to Imuya Bay), then due south, and a line extending 135° southeast from Kupreanof Point at 55° 33.98' N. lat., 159° 35.88' W. long.

5 AAC 01.460. FISHING SEASONS. Fish, other than rainbow trout and steelhead trout, may be taken at any time, except as may be specified by a subsistence fishing permit. Rainbow trout and steelhead trout, taken incidentally in other finfish net fisheries, are lawfully taken and may be retained for subsistence purposes.

5 AAC 01.466. CUSTOMARY AND TRADITIONAL SUBSISTENCE USES OF FISH STOCKS. The Alaska Board of Fisheries finds that salmon and finfish other than salmon, except steelhead and rainbow trout, in the Chignik Area are customarily and traditionally taken or used for subsistence.

5 AAC.01.470. LAWFUL GEAR AND GEAR SPECIFICATIONS. (a) Salmon may be taken by seines and gillnets, or with gear specified on a subsistence fishing permit, except that salmon in Chignik Lake may not be taken with purse seines.

(b) Fish other than salmon may be taken by gear listed in sec. 10(a) of this chapter, unless restricted under the terms of a subsistence fishing permit.
(c) Halibut may be taken for subsistence purposes only by a single handheld line with no more than two hooks attached.

5 AAC 01.475. WATERS CLOSED TO SUBSISTENCE FISHING. Salmon may not be taken (1) from July 1 through August 31, in the Chignik River from a point 300 feet upstream from the Chignik weir to Chignik Lake; (2) in Black Lake or any tributary to Black Lake or Chignik Lake.

5 AAC 01.480. SUBSISTENCE FISHING PERMITS. (a) Salmon, trout and char may only be taken under the authority of a subsistence fishing permit.

(b) Not more than 250 salmon may be taken for subsistence purposes unless otherwise specified on the subsistence fishing permit.
(c) A record of subsistence-caught fish must be kept on the reverse side of the permit. The record must be completed immediately upon taking subsistence-caught fish and must be returned to the local representative of the department no later than December 31 of the year issued.

SPECIAL PERMIT PROVISIONS

1. The adipose fin must be removed from all subsistence-caught salmon immediately upon capture.

2. A commercial salmon fishing license holder (a CFEC permit holder or anyone holding a 2005 crewmember license) may not subsistence fish for salmon during the 24 hours before a commercial salmon fishing period or during the 12 hours following the closure of a commercial salmon fishing period.

3. Commercial salmon license holders wishing to subsistence fish for salmon during a commercial fishing period may do so with a maximum of 50 fathoms of gillnet gear if they register with the department at the Chignik Weir prior to subsistence fishing for salmon.

4. A commercial license holder may not fish for both subsistence and commercial salmon at the same time. Further, a commercial salmon vessel may not carry both subsistence and commercially caught salmon at the same

5. Commercial fishermen may always remove salmon from their commercial catch for personal use. Mark the number of salmon taken by species for personal use on your fish ticket.

6. These special permit provisions for increased subsistence fishing opportunities will be withdrawn if they interfere with orderly commercial fishing.